

## Module descriptions

Number of the module	Name of the module	Responsible university lecturer
<b>FOMT 1.1</b>	<b>Tropical Climate and Ecology</b>	<b>Prof. Dr. M. Roth</b>
<b>Contents and goals of qualification</b>	<p><u>Contents:</u> Abiotic factors with relevance for climate, and the feedbacks of ecosystems, atmosphere and hydrosphere. Climate systems, certain stocks, fluxes of matter and land-use with examples from the tropics. General circulation, micro and macro-climate, forests and water, and basic concepts of the soil-vegetation-atmosphere transfer.</p> <p>Key concepts of ecology on the level of individual organisms, (meta-)populations, species communities and ecosystems as a part of landscapes. Forms of biodiversity in consideration of species and functional diversity in various spatial and temporal scales as well as drives for change. Ecosystem functions and ecosystem services in the context of sustainability.</p> <p><u>Goals of qualification:</u> The students understand tropical ecosystem structure and functioning. They recognize causalities and effects of drives for changing of the dynamic equilibrium within populations, communities and the entire biosphere with the inclusion of the interfaces to the atmosphere and hydrosphere. They are able to analyze and evaluate the possibilities and limits of control, sustainable utilization as well as regeneration of tropical (forest) ecosystems. They are capable of identifying causal-analytical problems for the protection, sustainable use and regeneration of tropical forest ecosystems and landscapes as well as to orientate their actions accordingly.</p> <p>They possess the knowledge of planning their actions and developing management competence for ecosystems and forest-related land use.</p>	
<b>Forms of teaching and learning</b>	<p>The module comprises:</p> <ul style="list-style-type: none"> <li>2.5 hrs/wk Lecture</li> <li>2.0 hrs/wk Seminar</li> <li>1.0 hrs/wk Exercise</li> <li>Independent studies</li> </ul>	
<b>Preconditions for participation</b>	<p>Fundamentals in biology, physics, chemistry and mathematics (basic course).</p> <p>Literature:</p> <p>Reece, J. B.; Campbell, N. A. (2011) Campbell biology: Concepts &amp; connections with mastering biology. N.J. Pearson Education. Upper Saddle River. (selected chapters).</p> <p>Aber, J. D.; Melillo, J. M. (2001) Terrestrial Ecosystems. Academic Press. San Diego, London, Burlington.</p> <p>Beeby, A.; Brennan, A.-M. (2004) First ecology. Oxford University Press, Oxford.</p>	
<b>Applicability</b>	<p>This module is compulsory in the area <i>Tropical Forestry and Management</i> of the Master course <i>Tropical Forestry</i>.</p>	
<b>Preconditions for granting of credits</b>	<p>The credits are acquired when the module examination has been passed. The module examination consists of a written test (90 minutes) and an oral report (20 minutes).</p>	
<b>Credits and grades</b>	<p>7 credits can be obtained by the module. The module grade results from the non-weighted average of the grades of the two examination performances.</p>	

<b>Frequency of the module</b>	The module is offered for each winter semester.
<b>Effort required</b>	The effort comprises 210 working hours.
<b>Length of the module</b>	The module extends over one semester.
<b>Literature accompanying the studies</b>	<p>Smith T.M.; Smith R. L. (2012) Elements of ecology. 8<sup>th</sup> ed. Pearson Education. Benjamin Cummings. San Francisco.</p> <p>Oke, T. R. (1987) Boundary layer climates. Methuen. London.</p> <p>Calver, M. (2009) Environmental biology. Cambridge University Press. Cambridge.</p> <p>Wright R. T. (2008) Environmental Science. Pearson Education International. London.</p> <p>Larcher, W. (2002) Physiological plant ecology: Ecophysiology and stress physiology of functional groups. Springer. New York.</p> <p>Schulze, E.-D.; Beck, E.; Müller-Hohenstein, K. (2005) Plant ecology. Springer. Berlin.</p>

<b>Number of the Module</b>	<b>Name of the module</b>	<b>Responsible university lecturer</b>
<b>FOMT 1.2</b>	<b>Forest related Development Policy and Culture</b>	<b>Prof. Dr. J. Pretzsch</b>
<b>Contents and goals of qualification</b>	<p><u>Contents</u>: Development models as a frame for policy and process analyses in regard to forest, land and environment in tropical countries. Political instruments with relevance for forest, nature conservation and local livelihoods of the indigenous population. Processes of institutional change, participation of stakeholder groups and potential consequences.</p> <p>Theoretical fundamentals of cultural ecology and ethnology, local moral and spiritual/religious concepts, connections between humans and forest. Traditional forest use in the tropics, colonial and post-colonial influences and changes as well as the influence of globalisation.</p> <p><u>Goals of qualification</u>: The students are able to diagnose and to assess social systems as linked with ecosystems and with respect to their historical dimension. This comprises the application of sociological analysis instruments and explanatory models. They recognized political structures and their mode of functioning at different levels and interlinking with politics, socio-economy, land use, forestry, environment protection and nature conservation. They are able to handle political instruments and to assess their functioning.</p> <p>They are capable of analysing, understanding and modelling the cultural conditions regarding the interrelationship of humans and forests.</p>	
<b>Forms of teaching and learning</b>	<p>The module comprises:</p> <ul style="list-style-type: none"> <li>3.5 hrs/wk Lecture</li> <li>2.0 hrs/wk Seminar</li> <li>1.5 hr/wk Exercise</li> <li>Independent studies</li> </ul>	
<b>Preconditions for participation</b>	<p>Knowledge of geography and history at extended upper school level (basic course).</p> <p>Literature:</p> <p>Todaro, M. P.; Smith, S. C. (2006) Economic development. Pearson Addison Wesley. Boston.</p> <p>Cubbage, F. W.; O'Laughlin, J.; Bullock, I. C. S. (1993) Forest resource policy. J. Wiley. New York.</p> <p>Ember C. R., Ember M. (2004) Cultural Anthropology. New Jersey. Englewood Cliffs.</p>	
<b>Applicability</b>	<p>The Module is compulsory within the Master course <i>Tropical Forestry</i>.</p>	
<b>Preconditions for allocation of credits</b>	<p>The credits are obtained, when the module examination has been passed. The module examination consists of a seminar paper (60 hours) and an oral examination performance (individual test, 20 minutes).</p>	
<b>Credits and grades</b>	<p>9 credits can be obtained by the module. The module grade results from the average of examination performances weighted as follows: seminar paper including 15 minutes presentation (33%), oral examination performance (67%).</p>	
<b>Frequency of the module</b>	<p>The module is offered each winter semester.</p>	
<b>Effort</b>	<p>The effort comprises 270 working hours.</p>	

<b>Length of the module</b>	The module extends over one semester.
<b>Literature accompanying the study</b>	<p>North, D. C. (1991) Institutions. <i>Journal of Economic Perspectives</i>, Vol. 5, Number 1, 97-112. American-Economic Association, Nashville, Tennessee.</p> <p>Pretzsch, J. (2005) Forest related rural livelihood strategies in national and global development. In: <i>Forests, trees and livelihoods</i>, Great Britain, Vol. 15, 115-117.</p> <p>Hunt, D. (1989) <i>Economic theories of development: An analysis of competing paradigms</i>. Harvester Wheatsheaf. London.</p> <p>Thirlwall, A. P. (2006) <i>Growth and development</i>. Palgrave MacMillan . Hampshire and New York.</p> <p>FAO (2012) <i>State of the World's Forest</i>. FAO, Rome.</p> <p>Messner, D.; Nuscheler, F. (2002) World politics – structures and trends. In: Kennedy, P.; Messner, D.; Nuscheler, F. (eds.), <i>Global Trends and Global Governance</i>, 125-155. Pluto, London.</p> <p>Ingold, T. (2000) <i>The Perception of the Environment. Essays on livelihood, dwelling and skill</i>. Routledge, London.</p> <p>Roger S. G. (2004) <i>This sacred earth. Religion, nature, environment</i>. 2nd ed., Routledge, New York and London</p> <p>Pretzsch, J. et al. (eds.) (2013) <i>Forests and rural development</i>. Springer, Heidelberg.</p>

<b>Number of the module</b>	<b>Name of the module</b>	<b>Responsible university lecturer</b>
<b>FOMT 1.3</b>	<b>Urban Tree Management in the Tropics</b>	<b>Prof. Dr. A. Roloff</b>
<b>Contents and Goals of qualification</b>	<p><u>Contents:</u> Planning, administration and management of woody plants and trees in urban, peri-urban and roadside habitats of tropical regions. Inventory and planning methods, governance, budgeting and implementation of urban and peri-urban tree management at all levels, from village to mega-city. Emphasis is put on services and products like environmental, cultural, social and socio-hygienic effects; production and utilization of tree products such as fruits and seeds, leaves, branches, wood, stumps and other products, as well as biological characteristics of tree species for their use as road-side trees.</p> <p>Management of urban forests, parks, gardens and individual trees, using tree care, methods of tree assessment, diagnosis of diseases, climbing plants and epiphytes), methods and equipment for determination of damage, reactions to wounds, crown-root interactions; wood increment , individual life history and valuation of the tree; genetics, safety aspects, legal obligations and pruning.</p> <p>Aspects of the science transfer, environmental education, local networks and governance.</p> <p><u>Goals of qualification:</u> The students are knowledgeable as to importance of trees and woody plants in urban and peri-urban landscapes, and as to problems of their integration at various levels. They are capable of planning urban tree management in tropical regions, to control it during the implementation phase and to evaluate it, thus being enabled to plan green spaces in tropical towns and to control their sustainable management.</p>	
<b>Forms of teaching and learning</b>	<p>The module comprises:</p> <ul style="list-style-type: none"> <li>3.00 hrs/wk Lecture</li> <li>2.00 hrs/wk Seminar</li> <li>1.5 hrs/wk Exercise</li> <li>1 day field trip</li> <li>Independent studies</li> </ul>	
<b>Preconditions for the participation</b>	<p>Knowledge in ecology, tree biology and management</p> <p>Literature: Miller, R.W. (1988/2007) <i>Urban Forestry</i>. Prentice-Hall, London.</p>	
<b>Applicability</b>	<p>The module is compulsory in the Master course <i>Tropical Forestry</i>.</p>	
<b>Preconditions for the allocation of credits</b>	<p>The credits are obtained, when the module examination has been passed. The module examination consists of a seminar paper incl. 15-min presentation (30 hours) and a written test (120 minutes).</p>	
<b>Credits and grades</b>	<p>8 credits can be obtained in the module. The module grade is derived from the average of the grades of the examination performances weighted as follows: seminar paper (33%), written examination performance (67%).</p>	
<b>Frequency of the module</b>	<p>The module is offered each winter semester.</p>	
<b>Effort</b>	<p>The effort comprises 240 working hours.</p>	
<b>Length of the module</b>	<p>The module extends over one semester.</p>	
<b>Literature accompanying the</b>	<p>Chin, W. Y. (2003) <i>Tropical trees and shrubs – a selection for urban plantings</i>. Sun Tree Publ., Singapore.</p>	

<b>study</b>	<p>Cox, S. (2011) Urban trees – a practical management guide. Crowood Press, Marlborough.</p> <p>Draper, B. D.; Richards, P. A. (2009) Dictionary for managing trees in urban environments. Csiro Publishing, Melbourne.</p> <p>Konijnendijk, C. C. et al. (2005) Urban forests and trees. Springer, Berlin.</p> <p>Roloff, A. (2004) Trees – Phenomena of adaptation and optimization. Ecomed, Landsberg.</p> <p>Trowbridge, P. J.; Bassuk, N. L. (2004) Trees in the urban landscape. Wiley, New Jersey.</p>
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<b>Number of module</b>	<b>Name of the module</b>	<b>Responsible university lecturer</b>
<b>FOMT 1.4A</b>	<b>Forest Utilization and Product Chains</b>	<b>Prof. Dr. J. Erler</b>
<b>Contents and goals of qualification</b>	<p><u>Contents</u>:. Processes of harvest, transportation, storage and processing of wood in terms of socio-economic and technical systems. Conducting and controlling of forestry operations. Identification of tropical timber based on its anatomical structure, physical and mechanical properties, as well as possible harvest, utilization and value added, referring to selected products from natural forests and forest plantations.</p> <p><u>Goals of qualification</u>: The students have acquired special knowledge of principles and systematic approaches to harvest, transportation, storage and processing of timber, as well as non-timber products. They are able to determine tropical timber species and know important non-timber products of tropical forests, including their potential for sustainable forest management. They are capable of independently developing and controlling technological processes of forest utilization and forest management and product processing, in particular timber harvest, transport, processing and optimization of timber grading.</p>	
<b>Forms of teaching and learning</b>	<p>The module comprises:</p> <p>3.0 hrs/wk Lecture 2.0 hrs/wk Seminar 1.0 hr/wk Exercise Independent studies</p>	
<b>Preconditions for the participation</b>	<p>Fundamentals in forest utilization. Conway, S. (1976) Logging practices: Principles of timber harvesting systems. Miller Freeman Publications, San Francisco.</p>	
<b>Applicability</b>	<p>The module is optional compulsory in the Master Course <i>Tropical Forestry</i>.</p>	
<b>Preconditions for the allocation of credits</b>	<p>The credits are obtained, when the module examination has been passed. The module examination consists of a written test (90 min) and an oral examination performance (individual test, 20 minutes).</p>	
<b>Credits and grades</b>	<p>7 credits can be obtained by the module. The module grade is derived from the average of the examination performances weighted as follows: written test (33%), oral examination performance (67%).</p>	
<b>Frequency of the module</b>	<p>The module is offered each winter semester.</p>	
<b>Effort</b>	<p>The effort comprises 210 working hours.</p>	
<b>Length of the module</b>	<p>The module extends over one semester.</p>	
<b>Literature accompanying the study</b>	<p>Hakkila P. (1989) Utilization of Residual Forest Biomass. Springer. Berlin. Tsoumis, G. (1991) Science and technology of wood. Van Nordstrand Reinhold, New York. Balick, M. J.; Elisabetsky, E.; Laird, S. A. (eds.) (1996) Medicinal resources of the tropical forest. Biodiversity and its importance to human health. Columbia University Press, New York.. FAO (2000 – 2010) Non-wood News. Information Bulletins, Rome. Webber C.M., Labaste P. (2010) Building Competitiveness in Africa's Agriculture: A Guide to Value Chain Concepts and Applications, Washington.</p>	

	<p><a href="https://openknowledge.worldbank.org/handle/10986/2401">https://openknowledge.worldbank.org/handle/10986/2401</a>. Kaplinsky, R. Morris, M. (2001) A Handbook For Value Chain Research. Paper prepared for the IDRC. <a href="http://www.prism.uct.ac.za/Papers/VchNov01.pdf">http://www.prism.uct.ac.za/Papers/VchNov01.pdf</a>. Ribot, J. C. (1998) Theorizing access: Forest profits along Senegal's charcoal commodity chain. <i>Development and Change</i> 29 (2) p. 307- 341.</p>
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<b>Number of the module</b>	<b>Name of the module</b>	<b>Responsible university lecturer</b>
<b>FOMT 1.4B</b>	<b>Assessment and Evaluation of Forest Resources</b>	<b>Prof. Dr. H. Röhle</b>
<b>Contents and goals of qualification</b>	<p><u>Contents:</u> Instruments and methods for tree mensuration, establishment and analysis of experimental plots in forests and short rotation plantations. Modelling and simulation of forest growth, timber yield and biomass. Biometrical methods with exemplary data sets. Methods of remote sensing and geographic information systems (GIS); data survey, using aeroplane and satellite aided sensor systems, as well as analysis methods based on the interpretation of aerial photographs and on digital satellite image classification, including their integration in geographic information systems. Computer-related exercises.</p> <p><u>Goals of qualification:</u> The students know the functioning, handling and use of important tree measuring instruments, as well as the methodology for assessing and analyzing forest growth and are familiar with respective modelling.</p> <p>They are capable of operationally utilizing analogous and digital remote sensing data, based on modern methods of analyses of aerial photographs and satellite images, as well as to apply image data and multi-thematic geo-data to the monitoring of land use and land use change.</p>	
<b>Forms of teaching and learning</b>	The module comprises:   2.5 hrs/wk Lecture 3.0 hr/wk Exercise Independent studies	
<b>Preconditions for participation</b>	<p>Mathematical-statistical fundamentals (Bachelor level). Literature: Loetsch, F.; Zöhner, F.; Haller, K.E. (1973) Forest inventory – vol. 2. BLV Verlagsgesellschaft. München, Bern, Wien. Bettinger, P.; Wing, M.G. (2003) Geographic information systems – applications in forestry and natural resources management. McGraw-Hill, New York. Lillesand, T.M.; Kiefer, R.W.; Chipman, J.W. (2004) Remote sensing and image interpretation. 5<sup>th</sup> ed. Wiley, New York.</p>	
<b>Applicability</b>	The module is optional compulsory (1.4 A or 1.4B) in the Master Course <i>Tropical Forestry</i> .	
<b>Preconditions for allocation of credits</b>	The credits are obtained, when the module examination has been passed. The module examination consists of a written report (30 hours) and a written test (90 minutes).	
<b>Credits and grades</b>	7 credits can be obtained by the module. The module grade results from the average of the examination performances, weighted as follows: Report (67%), and written test (33%).	
<b>Frequency of the module</b>	The module is offered each winter semester.	
<b>Effort</b>	The effort comprises 210 working hours.	
<b>Length of the module</b>	The module extends over one semester.	
<b>Literature accompanying the study</b>	<p>Cochran, W. G. (1977) Sampling techniques. 3<sup>rd</sup> ed. John Wiley &amp; Sons. New York. Vanclay, J. (1999) Modelling forest growth and yield. CABI Publishing, New York.</p>	

	<p>West, P. W. (2004) Tree and forest measurement. Springer, Berlin Heidelberg New York.</p> <p>Wulder, M. A.; Franklin, S. E. (eds.) (2003) Remote sensing for forest environments – concepts and case studies. Kluwer. Dordrecht, Boston, London.</p> <p>Zar, J. H. (1996) Biostatistical analysis. 3<sup>rd</sup> ed. Prentice Hall, New Jersey.</p>
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<b>Number of the module</b>	<b>Name of the module</b>	<b>Responsible university lecturer</b>
<b>FOMT 1.5</b>	<b>Economics and Management of Forest Resources</b>	<b>apl. Prof. Dr. P. Deegen</b>
<b>Contents and goals of qualification</b>	<p><u>Contents:</u> Economics (part A): Economic principles of human actions demonstrated by the forest rotation problem and other questions of even-aged forest stands, and problems encountered during activities in uneven-aged forest stands. Investigating human interactions by means of environmental and ecosystem related performances in forestry.</p> <p>Management of enterprises (part B): Strategic planning, forest management planning as well as planning and control of forest management measures. Development of a continuous forest inventory design as well as the construction of a GIS aided management information system is demonstrated, by examples of the management in the tropics.</p> <p><u>Objectives of qualification:</u> The students understand principles and techniques of forest economics and can independently apply these to the analysis of forestry-related actions and to the management of forest enterprises. They master the concepts of the inter-temporal efficiency for both timber production and the provision of environmental and other ecosystem services. They are able to apply economic instruments for planning of management decisions and for controlling of managerial decisions in the tropics.</p>	
<b>Forms of teaching and learning</b>	<p>The module comprises:</p> <ul style="list-style-type: none"> <li>2.00 hrs/wk Lecture</li> <li>1.5 hrs/wk Seminar</li> <li>2.0 hrs/wk Exercise</li> <li>Independent studies</li> </ul>	
<b>Preconditions for participation</b>	<p>Knowledge of mathematics at extended upper school level (basic course).</p> <p>Literature: Davis, L. S.; Johnson, K. N. (1986) Forest management. McGraw-Hill. New York.</p>	
<b>Applicability</b>	<p>The module is compulsory in the Master course <i>Tropical Forestry and Management</i>. Regarding the study unit <i>Sustainable Tropical Forestry</i> the module is optional compulsory with module 1.7.</p>	
<b>Preconditions for allocation of credits</b>	<p>The credits are obtained, when the module examination has been passed. The module examination is a written test (120 minutes).</p>	
<b>Credits and grades</b>	<p>7 credits can be obtained by the module. The module grade corresponds to the grade of the written test.</p>	
<b>Frequency of the module</b>	<p>The module is offered each summer semester.</p>	
<b>Effort</b>	<p>The effort comprises 210 working hours.</p>	
<b>Length of the module</b>	<p>The module extends over one semester.</p>	
<b>Literature</b>	<p>Neher, P. A. (1993) Natural resource economics. Conservation and exploitation. Cambridge University Press. Cambridge.</p> <p>Buongiorno, J.; Gilles, J. K. (2003) Decision methods for forest resource management. Academic Press. Amsterdam.</p> <p>Chang, S. J. (1983) Rotation age, management density, and the economic factors of timber production: do changes in stumpage price, interest rate, regeneration cost, and forest taxation matter?</p>	

	<p>Forest Science, vol, 29, no. 2, pp. 267-277. SAF, Bethesda.</p> <p>Chang, S. J.; Deegen, P. (2011) Pressler's indicator rate formula as a guide for forest management. J. of Forest Economics, vol. 17, issue 3, 258-266.</p> <p>Buchanan, J. M. (1999) The demand and supply of public goods. Liberty Fund. Indianapolis.</p> <p>Leuschner, W. A. (1990) Forest regulation, harvest scheduling and planning techniques. Wiley &amp; Sons. New York.</p> <p>Loetsch, F.; Haller, K. E. (1964) Forest inventory. Vol. I. BLV-Verlag. München.</p> <p>Loetsch, F.; Zöhrer, F.; Haller, K. E. (1973) Forest inventory. Vol. II. BLV-Verlag. München.</p>
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<b>Number of the module</b>	<b>Name of the module</b>	<b>Responsible university lecturer</b>
<b>FOMT 1.6</b>	<b>Organisation and Management Systems</b>	<b>Prof. Dr. J. Pretzsch</b>
<b>Contents and goals of qualification</b>	<p><u>Contents</u>: Methodical approaches of management analyses for subsistence oriented farm households; about forest/agroforestry enterprises up to large commercial industrial enterprises in the tropics. Partnership models for forest management, like co-operatives, community forests, co-management organizations. Managerial factors and processes as well as their qualitative and quantitative assessment and evaluation. Internal and external factors determining the management in the context of their socio-cultural, economic and natural framework.</p> <p><u>Goals of qualification</u>: The students can employ methods for socio-economic analysis of forestry enterprises and organizations. This includes methods for interpretation of the results and the comparative analysis. They are able to recognize managerial profiles and to differentiate between them by technological, economic and social criteria, as well as to independently conduct managerial analyses. By means of case studies the students got to know methodological instruments for socio-economic development of enterprises and organizations.</p>	
<b>Forms of teaching and learning</b>	<p>The module comprises:</p> <ul style="list-style-type: none"> <li>2.0 hrs/wk Lecture</li> <li>2.0 hrs/wk Seminar</li> <li>0.5 hrs/wk Exercise</li> <li>3-day field trip</li> <li>Independent studies</li> </ul>	
<b>Preconditions for participation</b>	<p>Basic knowledge in forestry, management, economics and in enterprise organisation (Bachelor level)</p> <p>Literature: Auch, E.; Pretzsch, J.; Uibrig, H. (2013) Organizational changes in forest management. In: Pretzsch, J. et al. (eds.) Forests and rural development. Springer, Heidelberg.</p>	
<b>Applicability</b>	<p>The module is compulsory in the Master course <i>Tropical Forestry</i>.</p>	
<b>Preconditions for the allocation of credits</b>	<p>The credits are obtained, when the module examination has been passed. The module examination consists of a seminar paper (30 hours) including 15 min oral presentation, and an oral examination performance (individual test, 20 minutes).</p>	
<b>Credits and grades</b>	<p>8 credits can be obtained in the module. The module grade results from the average of the grades of the examination performances, weighted as follows: Seminar paper (33%), oral examination performance (67%).</p>	
<b>Frequency of the module</b>	<p>The module is offered each summer semester.</p>	
<b>Effort</b>	<p>The effort comprises 240 working hours.</p>	
<b>Length of the module</b>	<p>The module extends over one semester.</p>	
<b>Literature accompanying the study</b>	<p>Klemperer, D. (1996) Forest resource economics and finance. McGraw-Hill. New York. Beets, W.C. (1990) Raising and sustaining productivity of smallholder farming systems in the tropics. AgBe Publishing. Alkmaar. Neher, P.A. (1993) Natural resource economics. Conservation and exploitation. Cambridge University Press. Cambridge.</p>	

	<p>Dillon, J.L.; Hardacker, J.B. (1993) Farm management research for small farmer development. Rome, FAO Farm Systems Management Series 6.</p> <p>McConnell, D.J.; Dillon, J.L. (1997) Farm management for Asia : a systems approach. Rome, FAO Farm Systems Management Series 13.</p>
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<b>Number of the module</b>	<b>Name of the module</b>	<b>Responsible university lecturer</b>
<b>FOMT 1.7</b>	<b>Management of Vegetation and Soil in Watersheds</b>	<b>Prof. Dr. K-H. Feger</b>
<b>Contents and goals of qualification</b>	<p><u>Contents:</u> Roles of the forests in watersheds and in the water cycles, as well as their ecosystem services as related to soil properties, like water retention. Current and future challenges in watershed management. Relationship between water and food security, climate change, integrated land use planning and management. Trade-offs and synergies between forestry and water resources management, notably in regions with low/uneven precipitation and high evaporation. Concepts of site-adequate and adapted land-use like agroforestry.</p> <p><u>Goals of qualification:</u> The students are able to understand and analyze the major factors and processes in plant-soil systems in context with watersheds. Furthermore, they are able to analyze land-use conflicts referring to soil and water resources. They are capable of applying methods to simulate and assess scenarios (climate, spatial distribution of land-use) as a basis for interdisciplinary concepts for sustainable watershed management. Besides the ability to teamwork they are able to properly communicate, present, argue, moderate and document the results.</p>	
<b>Forms of teaching and learning</b>	<p>The module comprises:</p> <ul style="list-style-type: none"> <li>2.0 hrs/wk Lecture</li> <li>2.0 hrs/wk Seminar</li> <li>1.5 hr/wk Project work</li> <li>1 day field trip</li> <li>Independent studies</li> </ul>	
Preconditions for the participation	<p>Knowledge in the fields of forest sciences, notably soil science, biogeochemistry, hydrology, climatology (Bachelor level)</p> <p>Literature:            Brady NC, Weil RR (2001) <i>The Nature and Properties of Soils</i>, 13<sup>th</sup> ed. Prentice Hall. Upper Saddle River.            Calder IR (2005) <i>Blue Revolution: Integrated Land and Water Resource Management</i>. Earthscan. London.</p>	
<b>Applicability</b>	<p>The module is compulsory in the study unit <i>Tropical Forestry and Management</i>. In the study unit <i>Sustainable Tropical Forestry</i> the module is optional compulsory with the module FOMT 1.5.</p>	
<b>Preconditions for allocation of credits</b>	<p>The credits are obtained, when the module examination has been passed. The module examination consists of a project paper (1 week) and a seminar paper (30 hours).</p>	
<b>Credits and grades</b>	<p>7 credits can be obtained in the module. The module grade results from the average of grades of the examination performances, weighted as follows: Protocol (33%), seminar paper (67%).</p>	
<b>Frequency of the module</b>	<p>The module is offered each summer semester.</p>	
<b>Effort</b>	<p>The effort comprises 210 working hours.</p>	
<b>Length of the module</b>	<p>The module extends over one semester, partly carried out in blocks.</p>	
<b>Literature accompanying the study</b>	<p>Brauman, K. A.; et al. (2007) The nature and value of ecosystem services: An overview highlighting hydrologic services. <i>Annual Review of Environmental Resources</i> 32, pp 67–98.            Feger, K-H.; Hawtree, D. (2013) Soil carbon and water security. In: Lal,</p>	

	<p>R. et al. (eds.) Ecosystem services and carbon sequestration in the biosphere. Springer. Dordrecht.</p> <p>Lal, R. (2009) Ten tenets of sustainable soil management. Journal of Soil and Water Conservation 64, 20A–21A. Soil and Water Conservation Society, Ankeny.</p> <p>Falkenmark, M.; Rockström, J. (2004) Balancing water for humans and nature: The New Approach in Ecohydrology. Routledge, London.</p> <p>Nair, P. K. et al. (2009) Agroforestry as a strategy for carbon sequestration. Journal of Plant Nutrition and Soil Science 172, 10–23. Wiley-VCH, Weinheim.</p> <p>UNEP (2009) Water security and ecosystem services: The critical connection. A contribution to the United Nations World Water Assessment Programme. UNEP Nairobi.</p>
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<b>Number of the module</b>	<b>Name of the module</b>	<b>Responsible university lecturer</b>
<b>FOMT 1.8A</b>	<b>Silviculture and Biodiversity in Natural Forest of the Tropics</b>	<b>Prof. Dr. S. Wagner</b>
<b>Contents and goals of qualification</b>	<p><u>Contents:</u> Ecosystem concept as an auxiliary for silviculture and for biodiversity conservation. Natural distribution and classification of forest and plant formations, as well as fauna in the tropics, as well as methods for their assessment. Important silvicultural systems with their methods and techniques in moist and dry forests. Population ecology with its natural regulation mechanisms, relationships between plants, herbivores, as well as between herbivores and their antagonists in the context of biodiversity and protection.</p> <p><u>Goals of qualification:</u> The students are able to classify, analyze and evaluate tropical forest ecosystems and to conceptualize appropriate silvicultural systems, according to the local conditions. They can analyze the plant-herbivore-antagonist relationships and assess biotic risks and regulation possibilities for natural forest management and thus the protection of biodiversity, as well as integrate management strategies. The students are able to design strategies for sustainable production and the protection of natural forest ecosystems.</p>	
<b>Forms of teaching and learning</b>	<p>The module comprises:</p> <ul style="list-style-type: none"> <li>3.0 hrs/wk Lecture</li> <li>2.0 hrs/wk Seminar</li> <li>1.5 hrs/wk Exercise</li> <li>Independent studies</li> </ul>	
<b>Preconditions for participating</b>	<p>Ecological fundamentals (Bachelor level). Literature: Kimmins, J. P. (1997) Forest ecology. A foundation for sustainable management. 2<sup>nd</sup> ed., Prentice Hall, New Jersey. Lamprecht, H. (1989) Silviculture in the tropics. Deutsche Gesellschaft für Technische Zusammenarbeit, Eschborn. Matthews, J. D. (1996) Silvicultural systems. Clarendon Press Oxford, Oxford. Huffaker C. B.; Gutierrez A. P. (1999) Ecological Entomology. 2nd ed. Wiley, New York.</p>	
<b>Applicability</b>	<p>The module is optional compulsory (1.8A or 1.8B) in the Master Course <i>Tropical Forestry</i>, of which one has to be selected</p>	
<b>Preconditions for allocation of credits</b>	<p>The credits are obtained, when the module examination has been passed. The examination performance consists of a seminar paper (20 hours), including an oral presentation of 15 min, and an oral examination performance (individual test, 20 minutes).</p>	
<b>Credits and grades</b>	<p>Seven credits can be obtained in the module. The module grade results from the average of the grades weighted as follows: Seminar paper (33 %), oral examination performance (67 %).</p>	
<b>Frequency of the module</b>	<p>The module is offered each summer semester.</p>	
<b>Effort</b>	<p>The effort comprises 210 working hours.</p>	
<b>Length of the module</b>	<p>The module extends over one semester.</p>	
<b>Literature accompanying the study</b>	<p>Dawkins, H. C.; Philip, M. S. (1998) Tropical moist forest silviculture and management: A history of success and failure. CABI, Wallingford. Ffolliott, P. F. et al. (1995) Dryland forestry. Planning and</p>	

	<p>management. Wiley, New York.</p> <p>Johnson, E. A.; Miyanishi, K. (2001) Forest fires. Behavior and ecological effects. Academic Press, San Diego.</p> <p>Richards, P. W. (1996) The tropical rain forest - an ecological study. 2<sup>nd</sup> ed. Cambridge University Press, Cambridge.</p> <p>Smith, D. M. et al. (1997) The practice of silviculture. Applied forest ecology. 9<sup>th</sup> ed. Wiley, New York.</p> <p>Ananthakrishnan, T. N. (1998) Technology in biological control. Science Publishers, New York..</p> <p>Denholm. I. et al. (1998) Insecticide Resistance: From Mechanisms to Management. CABI, Wallingford.</p> <p>Pearce, M.J. (1997) Termites. Biology and pest management. CABI, Wallingford.</p> <p>Speight, M. R.; Wylie, F. R. (2001) Insect pests in tropical forestry. CABI, Wallingford.</p>
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<b>Number of the module</b>	<b>Name of the module</b>	<b>Responsible university lecturer</b>
<b>FOMT 1.8B</b>	<b>Silviculture in Forest Plantations and Agroforestry in the Tropics</b>	<b>Prof. Dr. J. Pretzsch</b>
<b>Contents and goals of qualification</b>	<p><u>Contents:</u> Silviculture and stages of production for forest plantations of pure and mixed stands as well as tree-plantings as an integral part of agroforestry in the tropics and subtropics. Case studies about representative genera and tree species with regional peculiarities. Forest protection strategies and innovations in forest plantations. Artificially established forest ecosystems and agroforestry systems as classified according to their functions. Attributes and methods for their evaluation and certification.</p> <p><u>Goals of qualification:</u> The students are enabled to analyse, classify and evaluate forest plantations and agroforestry systems by components, as well as to design integrated forest protection strategies and to further develop innovative technologies. They are able to conduct reconnaissance surveys as well as to conceptualize forest plantations and woody components of agroforestry systems in the tropics.</p>	
<b>Forms of teaching and learning</b>	<p>The module comprises:</p> <ul style="list-style-type: none"> <li>3.00 hrs/wk Lecture</li> <li>2.00 hrs/wk Seminar</li> <li>1.5 hrs/wk Exercise</li> <li>Independent studies</li> </ul>	
<b>Preconditions for participation</b>	<p>Knowledge of ecological fundamentals (Bachelor level).  Literature:  Burkhart, H. E.; Tomé, M. (2012) Modeling forest trees and stands. Springer, Dordrecht.  Evans, J.; Turnbull, J. W. (2004) Plantation forestry in the tropics. 3<sup>rd</sup> edition. Oxford University Press, Oxford.  Huxley, P. (1999) Tropical agroforestry. Blackwell Science, Oxford.  Nair, K. S. S. (2007) Tropical forest insect pests. Ecology, impact and management. Cambridge University Press. Cambridge.  Nair, P. K. R. (1993) An introduction to agroforestry. Kluwer Academic Publishers, Dordrecht.  Wylie, F. R.; Speight, M. R. (2012) Insect pests in tropical forestry. 2<sup>nd</sup> ed. CABI. Wallingford.</p>	
<b>Applicability</b>	<p>The module is optional compulsory (1.8A or 1.8B) in the Master course <i>Tropical Forestry</i>.</p>	
<b>Preconditions for allocation of credits</b>	<p>The credits are obtained, when the module examination has been passed. The module examination performance consists of a seminar paper (30 hours) including an oral presentation (15 min), and an oral examination performance (individual test, 20 minutes).</p>	
<b>Credits and grades</b>	<p>7 credits can be obtained in the module. The module grade is derived from the average of grades weighted as follows: Seminar paper (33%) and oral examination performance (67%).</p>	
<b>Frequency of the module</b>	<p>The module is offered in each summer semester.</p>	
<b>Effort</b>	<p>The effort comprises 210 working hours.</p>	
<b>Length of the module</b>	<p>The module extends over one semester.</p>	
<b>Literature accompanying the study</b>	<p>Alavalapati, R. R.; Mercer, D. E. (2004) Valuing agroforestry systems – methods and applications. Kluwer Academic Publishers, Dordrecht.</p>	

	<p>Ashton, M. S.; Montagnini, M. F. F. (1999) The silvicultural basis for agroforestry systems. CRC Press, Washington, D.C.</p> <p>Boyle, J. R.; Winjum, J. K.; Kavanagh, K.; Jensen, E. C. (1999) Planted forests: contribution to the quest for sustainable societies. Forestry Sciences 56, Kluwer Academic Publishers, Dordrecht.</p> <p>Günter, S. et al. (2011) Silviculture in the tropics. Springer Berlin Heidelberg.</p> <p>Matthews, J. D. (1996) Silvicultural systems. Clarendon Press Oxford, Oxford.</p> <p>Nair, P. K. R. et al. (2004) New vistas in agroforestry – a compendium for the 1<sup>st</sup> World Congress of Agroforestry 2004. Kluwer Academic Publishers, Dordrecht.</p> <p>Watt, A. D.; Stork, N. E.; Hunter, M. D. (1997) Forests and Insects. Chapman &amp; Hall, London.</p> <p>Young, A. (1997) Agroforestry for soil management. 2<sup>nd</sup> ed. ICRAF, CABI. Wallingford.</p>
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<b>Number of the module</b>	<b>Name of the module</b>	<b>Responsible university lecturer</b>
<b>FOMT 2.1</b>	<b>Designing and Planning the Research</b>	<b>Prof. Dr. J. Pretzsch</b>
<b>Contents and goals of qualification</b>	<p><u>Contents:</u> Hermeneutic fundamentals as well as analytical methods in natural science, engineering and social sciences. Quantitative-statistical and qualitative assessment and evaluation methods. Standards of scientific publications and strategies for their implementation. Research plan for a topic out of the thematic fields of ecology, technology or socioeconomics and culture in the tropics including work plan.</p> <p><u>Goals of qualification:</u> The students are able to apply scientific methods for data collection, data analysis and evaluation of the results within the complex environment of a tropical country. They are prepared to design a research plan for the Master thesis. The capability of writing and evaluating scientific papers is further developed. The students are qualified to independently elaborate research projects.</p>	
<b>Forms of teaching and learning</b>	The module comprises: 4.00 hrs/wk Lecture 3.0 hrs/wk Seminar 1.00 hrs/wk Exercise Independent studies	
<b>Preconditions for participation</b>	<p>Knowledge in the fields of forest sciences (Bachelor level). Literature: Creswell, J. W. (2003) Research design. Qualitative and quantitative methods, approaches. 2<sup>nd</sup> ed. Thousand Oaks, California. Yin, R. K. (1994) Case study research - design and methods. SAGE Publications, Newbury Park, London, New Delhi.</p>	
<b>Applicability</b>	The module is compulsory in the study unit <i>Tropical Forestry and Management</i> of the Master course <i>Tropical Forestry</i> .	
<b>Preconditions for the allocation of credits</b>	The credits are obtained, when the module examination has been passed. The module examination consists of the written report (30 hours) and the research plan (135 hours).	
<b>Credits and grades</b>	10 credits can be obtained in the module. The module grade is derived from the average of the grades of the examination performances weighted as follows: Written report (33 %), research plan (67 %).	
<b>Frequency of the module</b>	The module is offered each winter semester.	
<b>Effort</b>	The effort comprises 300 working hours.	
<b>Length of the module</b>	The module extends over one semester.	
<b>Literature accompanying the study</b>	<p>Angelsen, A. et al. (ed) (2011) Measuring livelihoods and environmental dependence. Methods for research and fieldwork. Earthscan. London, Washington. Czaja, R.; Blair, J. (1996) Designing surveys. A guide to decisions and procedures. Sage Publications. Thousand Oaks. Freese, F. (1984) Statistics for land managers. Paeony Press. Jedburgh. Neuman, W. L. (1994) Social research methods – qualitative and quantitative approaches. Allyn and Bacon, Massachusetts. Rohrmoser, K. (1985) Handbook for field trials in technical cooperation. GTZ, Eschborn.</p>	

	Silverman, D. (2001) Interpreting qualitative data. Methods for analysing talk, text and interaction. 2 <sup>nd</sup> ed. SAGE . Thousand Oaks. Stern, R. D.; Coe, R.; Allan, E. F.; Dale, I. C. (2004) Good statistical practice for natural resources research. CABI Publishing. Cambridge.
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<b>Number of the module</b>	<b>Name of the module</b>	<b>Responsible university lecturer</b>
<b>FOMT 2.2</b>	<b>Planning at Project and Landscape Scales</b>	<b>Prof. Dr. J. Pretzsch</b>
<b>Contents and goals of qualification</b>	<p><u>Contents:</u> Methods to analyse problems and strengths, to identify objectives; methods and tools for project and program planning, the implementation of which and monitoring as well as impact assessments in developing and emerging countries, including the project environment, stakeholders, project economy and efficiency, learning and innovations, as well as methods of forestry extension. Elaboration in work groups of planning documents for a forestry or agroforestry project. Methodical principles of integrated land use planning and management at the level of landscapes in regard to specific interests, requirements and activities of the sectors and stakeholder groups.</p> <p><u>Goals of qualification:</u> The students are qualified for independently planning of projects, for controlling the implementation and evaluation. They are aware of influence factors for human behaviour and learning and are able to develop extension strategies as well as to support processes within an intercultural context. They develop qualifications for teamwork, communication, presentation and moderation and can understand and analyze interactions in the sectors with respect to synergies and competition. They are familiar with methods of multi-sectoral land use planning as well as with disciplinary and interdisciplinary concepts for sustainable land use management.</p>	
<b>Forms of teaching and learning</b>	<p>The module comprises:</p> <ul style="list-style-type: none"> <li>3.0 hrs/wk Lecture</li> <li>2.0 hrs/wk Exercise</li> <li>1.5 hr/wk Project elaboration</li> <li>Independent studies</li> </ul>	
<b>Preconditions for participation</b>	<p>Knowledge of forest policies and development policy, managerial economics and management organization (Bachelor level).</p>	
<b>Applicability</b>	<p>The module is compulsory in the study unit <i>Tropical Forestry and Management</i> of the Master Course <i>Tropical Forestry</i>.</p>	
<b>Preconditions for allocation of credits</b>	<p>The credits are obtained, when the module examination has been passed. The module examination consists of a project paper (2 weeks) and a written test (90 minutes).</p>	
<b>Credits and grades</b>	<p>Eight credits can be obtained in the module. The module grade results from the average of the grades weighted as follows: Project paper (33%) and written test (67%).</p>	
<b>Frequency of the module</b>	<p>The module is offered in each winter semester.</p>	
<b>Effort</b>	<p>The effort comprises 240 working hours.</p>	
<b>Length of the module</b>	<p>The module extends over one semester.</p>	
<b>Literature accompanying the study</b>	<p>Knowledge in the fields of forest sciences.  Literature:  Dalal-Clayton, B.; Dent, D.; Dubois, O. (2003) Rural planning in developing countries – supporting natural resource management and sustainable livelihoods. Earthscan, London.  Dusseldorp, D. B. W. M. v. (1990) Planned development via projects. Its necessity, limitations and possible improvements. In: Sociologia</p>	

	<p>Ruralis Vol. XXX, No.3-4, 337-352</p> <p>FAO (1995): Planning for sustainable use of land resources: Towards a new approach. FAO Land and Water Bulletin 2 Rome.</p> <p>Gittinger, J. P. (1982) Economic analysis of agricultural projects. The John Hopkins University Press. Baltimore &amp; London.</p> <p>McGhee, P.; McAliney, P. (2007) Painless project management / a step-by-step guide for planning, executing, and managing projects. Wiley. Hoboken.</p> <p>Darr, D. et al. (2013) Extension services for rural development. In: Pretzsch, J. et al. (ed.) Forests and rural development. Springer, Heidelberg.</p> <p>Hoffmann, V. et al. (eds.) (2009) Handbook rural extension 1: Basic issues and concepts. 3rd ed. Margraf, Weikersheim.</p> <p>Rogers, E. M. (2003) Diffusion of innovations. 5th edition, Free Press, New York.</p>
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<b>Number of the module</b>	<b>Name of the module</b>	<b>Responsible university lecturer</b>
<b>FOMT 2.3A</b>	<b>Modelling</b>	<b>Prof. Dr. U. Berger</b>
<b>Contents and goals of qualification</b>	<p><u>Contents:</u> An overview of individual-based and agent-based modelling (IBM/ABM), model development, implementation, parameterization, and sensitivity analysis. Handling of uncertainties in data, the design of simulation experiments and statistical analyses of the results. Integration into models of spatial data by Geographical Information Systems (GIS). Geo-data processing and –integration, visualization as well as elementary analyses.</p> <p><u>Goals of Qualification:</u> The students are able to design and program models, as well as to conduct and analyze simulation experiments, using IBM/ABM. They are able to generate, handle and analyse geo-data, and to use them as input into IBM/ABM.</p>	
<b>Forms of teaching and learning</b>	<p>The module comprises:</p> <ul style="list-style-type: none"> <li>1.0 hr/wk Lecture</li> <li>1.5 hrs/wk Exercise</li> <li>1.0 hr/wk Exercise (e-learning)</li> <li>Independent studies</li> </ul>	
<b>Preconditions for participation</b>	<p>Active collaboration and willingness to conduct simulation experiments and analyse modelling results; overview of purpose and needs of modelling in ecology and social sciences; mathematical-statistical fundamentals.</p> <p><u>Literature</u>  Grimm, V.; Railsback, S. F. (2005) Individual-based Modeling and Ecology. Princeton University Press. Princeton.  Gilbert, N.; Troitzsch, K. G. (2005) Simulation for the Social Scientists. Open University Press, Maidenhead.  Gotelli, N. J.; Ellison, A. M. (2013) A Primer of Ecological Statistics. 2nd revised edition. Sinauer Associates, Sunderland.</p>	
<b>Applicability</b>	<p>The module is optional compulsory in the Master Course <i>Tropical Forestry</i>.</p>	
<b>Preconditions for allocation of credits</b>	<p>The credits are obtained, when the module examination has been passed. The module examination consists of a written report related to GIS (15 hours) and an oral presentation related to IBM/ABM (20 min).</p>	
<b>Credits and grades</b>	<p>Five credits can be obtained in the module. The module grade results from the average of the grades weighted as follows: report (25%) and project presentation (75%).</p>	
<b>Frequency of the module</b>	<p>The module is offered each winter semester.</p>	
<b>Effort</b>	<p>The effort comprises 150 working hours.</p>	
<b>Length of the module</b>	<p>The module extends over one semester.</p>	
<b>Literature accompanying the study</b>	<p>Railsback, S. F.; Grimm, V. (2011) Agent-Based and Individual-Based Modeling: A Practical Introduction. Princeton University Press. Princeton.  de Smith, M.; Goodchild, M.; Longley, D. (2008) Geospatial Analysis. Available under <a href="http://www.spatialanalysisonline.com">www.spatialanalysisonline.com</a>.  Worboys, M. F.; Duckham, M. (2004) GIS: A Computing Perspective (2nd ed.) CRC Press. Boca Raton.</p>	

<b>Number of the module</b>	<b>Name of the module</b>	<b>Responsible university lecturer</b>
<b>FOMT 2.3B</b>	<b>Communication and Conflict Management</b>	<b>Prof. Dr. J. Pretzsch</b>
<b>Contents and Goals of qualification</b>	<p><u>Contents:</u> Theories and concepts of verbal and nonverbal communication are introduced. Communication as social behaviour, conflicts as part of social systems and conflict solution, psychological dispositions and perception of human beings. Rhetorical rules and psychological patterns for purposeful actions and reactions when disputing about natural resources. Methods and instruments for proactive situation-related interventions in on-going communication, negotiation, discourses and conflicts. Strategies for mediation, meta-plan moderation, as well as participation in the context of rural development. Communication with Rapid Rural Appraisal, Participatory Rural Appraisal and in field laboratories.</p> <p><u>Goals of qualification:</u> The students are able to assess conflicts, select methods and tools for their handling, and apply them in the field. They are able to rely on ethical norms in problem handling and to lead communication processes in a democratic and participatory manner. The students are capable of guiding communication processes among stakeholder groups, as well as to conduct participatory surveys.</p>	
<b>Forms of teaching and learning</b>	<p>The module comprises:    2.0 hrs/wk Lecture                                             1.0 hrs/wk Seminar                                             1.0 hrs/wk Project work                                             Independent studies</p>	
<b>Preconditions for the participation</b>	<p>Knowledge of natural forest and plantation management and nature conservation (Bachelor level)          Literature:          Moore, C. W. (2003) The mediation process. Updated and revised 3<sup>rd</sup> ed., Jossey-Bass, San Francisco.          Klebert, K. et al. (2000): Winning group results. Techniques for Guiding Group Thought and Decision Making Processes with the Moderation Method. 2nd ed. Windmühle, Hamburg.</p>	
<b>Applicability</b>	<p>The module is optional compulsory in the Master Course <i>Tropical Forestry</i>.</p>	
<b>Preconditions for the allocation of credits</b>	<p>The credits are acquired, when the module examination has been passed. The module examination consists of a project paper (1 week) and a written test (90 minutes).</p>	
<b>Credits and grades</b>	<p>Five credits can be obtained in the module. The module grade results from average of the grades of the examination performances weighted as follows: project paper (33%) and the written examination performance (67%).</p>	
<b>Frequency of the module</b>	<p>The module is offered each winter semester.</p>	
<b>Effort</b>	<p>The effort comprises 150 working hours.</p>	
<b>Length of the module</b>	<p>The module extends over one semester.</p>	
<b>Literature</b>	<p>Miall, H., et al. (2011) Contemporary conflict resolution: The prevention, management and transformation of deadly conflicts, 3<sup>rd</sup> ed. Polity Press. Cambridge.</p>	

	<p>Wilkenfeld, J. et al. (2005) <i>Mediating International Crisis</i>. Routledge, New York.</p> <p>Bercovitch, J. (ed) (2002) <i>Studies in international mediation: Essays in honor of Jeffrey Z. Rubin</i>. Macmillian, New York.</p> <p>Kalyvas, S. (2006) <i>The logic of violence in civil wars</i>. Cambridge University Press. Cambridge.</p>
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<b>Number of the module</b>	<b>Name of the module</b>	<b>Responsible university lecturer</b>
<b>FOMT 2.4A</b>	<b>Management Systems and Restoration in Natural Forest of the Tropics</b>	<b>Prof. Dr. S. Wagner</b>
<b>Contents and goals of qualification</b>	<p><u>Contents</u>: Management systems for natural forest management in the tropics. Elements for planning, implementation, monitoring and controlling. Management strategies, using decision-theoretical models. Management of various forest formations, regions, sustainability units and forest enterprises. Production strategies and value added chains for timber, non-timber products and environmental services of the forest. Biodiversity management, integrated forest protection and fire management in natural tropical and subtropical forests on the basis of case studies.</p> <p><u>Goals of qualification</u>: The students have acquired special knowledge of important management systems for tropical forests. They are able to apply methods of planning, implementing, monitoring and governing for the management of natural forests and are capable to apply multi-functional strategies for the management of tropical natural forests.</p>	
<b>Forms of teaching and learning</b>	<p>The module comprises:</p> <ul style="list-style-type: none"> <li>3.00 hrs/wk Lecture</li> <li>2.00 hrs/wk Seminar</li> <li>0.50 hrs/wk Exercise</li> <li>1-day field trip</li> <li>Independent studies</li> </ul>	
<b>Preconditions for participation</b>	<p>Knowledge of subject fields of forestry (Bachelor level). Literature: Lamprecht, H. (1989) <i>Silviculture in the tropics</i>. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) Eschborn. Matthews, J. D. (1996) <i>Silvicultural systems</i>. Clarendon Press Oxford, Oxford. Johnson, E. A.; Miyanishi, K. (2001) <i>Forest fires. Behavior and ecological effects</i>. Academic Press, San Diego. Speight, M. R.; Wylie, F. R. (2001) <i>Insect pests in tropical forestry</i>. CABI Wallingford.</p>	
<b>Applicability</b>	<p>The module is optional compulsory in the Master Course <i>Tropical Forestry</i>.</p>	
<b>Preconditions for allocation of credits</b>	<p>The credits are obtained, when the module examination has been passed. The module examination consists of a seminar paper (30 hours) including oral presentation over 15 min and a written test (90 minutes).</p>	
<b>Credits and grades</b>	<p>Seven credits can be obtained in the module. The module grade results from the average of the examination performances weighted as follows: Seminar paper (33%), written test (67%).</p>	
<b>Frequency of the module</b>	<p>The module is offered each winter semester.</p>	
<b>Effort</b>	<p>The effort comprises 210 working hours.</p>	
<b>Length of the module</b>	<p>The module extends over one semester.</p>	
<b>Literature accompanying the study</b>	<p>Clemen, R. (1996) <i>Making hard decisions</i>. Duxbury Press. Pacific Grove. Ffolliott, P. F.; Brooks, K. N.; Gregersen, H. N.; Lundgren, A. L. (1995) <i>Dryland forestry. Planning and management</i>. John Wiley &amp;</p>	

	<p>Sons, Inc., New York.</p> <p>Buongiorno, J.; Gilles, K. (2003) Decision methods for forest resource management. Academic Press. Amsterdam, Boston</p> <p>Goldammer, J. G. (1993) Fire management. In: Pancel, L. (ed.) (1993) Tropical Forestry Handbook. Springer-Verlag Berlin Heidelberg New York, pp.1221-1268.</p> <p>Heikkilä, T. V.; Grönqvist, R.; Jurvelius, M. (1993) Handbook on forest fire control. Forestry Training Programme Publication 21 Helsinki.</p> <p>Speight, M. R.; Wainhouse, D. (1989) Ecology and management of forest insects. Oxford University Press. Oxford.</p> <p>Watt, A. D.; Stork, N. E.; Hunter, M. D. (1997) Forests and insects. Chapman &amp; Hall, London.</p> <p>Heyde, W. F. (1980) Timber supply, land allocation and economic efficiency. John Hopkins Univ. Press. Baltimore.</p> <p>Nehrer, P. A. (1993) Natural resource economics. Conservation and exploitation. Cambridge University Press. Cambridge.</p>
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<b>Number of the module</b>	<b>Name of the module</b>	<b>Responsible university lecturer</b>
<b>FOMT 2.4B</b>	<b>Management Systems of Forest Plantations and Rehabilitation of the Landscape in the Tropics</b>	<b>Prof. Dr. J. Pretzsch</b>
<b>Contents and goals of qualification</b>	<p><u>Contents:</u> Management of production and protection systems in forest plantations. Timber production, agroforestry, value added chains as well as erosion control, fire prevention and land rehabilitation. Assessment of forest plantations and shelter plantings, their modelling and evaluation. Forest plantation establishment as well as organization, and control of management, the involvement of stakeholders and the ascertainment of needed research. Linking of land rehabilitation and integrated land-use management.</p> <p><u>Goals of qualification:</u> The students are able to assess forest plantations in the tropics in regard to their potential of yield and risks, including modelling and comprehensive evaluation by ecological, economic and social criteria. They are capable of planning, establishing and managing the planted forests according to the agreed objectives as well as of incorporating relevant stakeholders. They are able integrate forest plantations in land-use concepts, as well as to diagnose certain research requirements.</p>	
<b>Forms of teaching and learning</b>	<p>The module comprises:</p> <ul style="list-style-type: none"> <li>3.0 hrs/wk Lecture</li> <li>2.0 hr/wk Seminar</li> <li>0.5 hrs/wk Exercise</li> <li>1-day field trip</li> <li>Independent studies</li> </ul>	
<b>Preconditions for the participation</b>	<p>Knowledge of the fields of forest sciences Literature: Burkhardt, H. E., Tomé, M. (2012) Modelling forest trees and stands. Springer, Dordrecht. Evans, J.; Turnbull, J.W. (2004) Plantation forestry in the tropics. 3<sup>rd</sup> ed. Oxford University Press, Oxford. Johnson, E.A.; Miyanishi, K. (2001) Forest fires. Behaviour and ecological effects. Academic Press, San Diego. Wylie, F.R.; Speight, M.R. (2012) Insect pests in tropical forestry. 2<sup>nd</sup> ed., CABI, Wallingford.</p>	
<b>Applicability</b>	<p>The module is optional compulsory in the Master Course <i>Tropical Forestry</i>.</p>	
<b>Preconditions for the allocation of credits</b>	<p>The credits are obtained, when the module examination has been passed. The module examination consists of a seminar paper (30 hours) and a written test (90 minutes).</p>	
<b>Credits and grades</b>	<p>Seven credits can be obtained in the module. The module grade is derived from the average of the grades of the examination performances, weighted as follows: seminar paper (33%) and the written examination (67%).</p>	
<b>Frequency of the module</b>	<p>The module is offered each winter semester.</p>	
<b>Effort</b>	<p>The effort comprises 210 working hours.</p>	
<b>Length of the module</b>	<p>The module extends over one semester.</p>	
<b>Literature accompanying</b>	<p>Smart, J. C. R.; Burgess, J. C. (2000) An Environmental economic</p>	

<p><b>the study</b></p>	<p>analysis of willow SRC production. In: J. of Forest Economics, vol. 6, no. 3, S. 193-225. Umea.</p> <p>Goldammer, J. G. (1993) Fire management. In: Pancel, L. (ed.) (1993) Tropical Forestry Handbook. Springer-Verlag Berlin Heidelberg New York, 1221-1268.</p> <p>Goldammer, J. G.; Jenkins, M. J. (eds.) (1990) Fire in ecosystem dynamics. SPB Academic Publishing, The Hague.</p> <p>Speight, M. R.; Wainhouse, D. (1989) Ecology and management of forest insects. Oxford University Press. Oxford.</p> <p>Watt, A. D.; Stork, N. E.; Hunter, M. D. (1997) Forests and insects. Chapman &amp; Hall, London.</p> <p>Wright, J. W. (1976) Introduction to Forest Genetics. Academic Press, New York.</p>
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<b>Number of module</b>	<b>Name of the module</b>	<b>Responsible university lecturer</b>
<b>FOMS 1.3</b>	<b>Climate Change and Tropical Forestry</b>	<b>Prof. Dr. J. Pretzsch</b>
<b>Contents and objectives of qualification</b>	<p><u>Contents</u>: Biophysical and economic impacts of climate change on forests in tropical and sub-tropical countries. Changes in forest cover and its composition, structure and growth for obtaining timber and non-wood forest products, and economic consequences associated with this. Forest related impacts on rural livelihoods, particularly regarding subsistence agriculture and small farmers, as well as the options for them to adaptation. Finding compromises, problems of food production, income and ecosystem functions including carbon fixation in different management systems.</p> <p><u>Goals of qualification</u>: The students have acquired knowledge of climate change, forests and livelihood relationships. They are able to critically assess and discuss actual situations and strategies and scientifically elaborate policy debates. They are able to actively participate in professional forums.</p>	
<b>Forms of teaching and learning</b>	The module comprises:      5 hrs/wk exercise (e-learning) Independent studies	
<b>Preconditions for participation</b>	Knowledge of tropical forestry related to various fields, regions and cultures (Bachelor level).	
<b>Applicability</b>	The module is compulsory within the study unit <i>Sustainable Tropical Forestry</i> in the Master course <i>Tropical Forestry</i> .	
<b>Preconditions for allocation of credits</b>	The credits are obtained, when the module examination has been passed. It consists of an e-learning test (180 minutes).	
<b>Credits and grades</b>	7 credits can be obtained by the module. The module grade is the grade of the e-learning test.	
<b>Frequency of the module</b>	The module is offered each summer semester.	
<b>Effort</b>	The effort comprises 210 working hours.	
<b>Length of the module</b>	The module extends over one semester.	

<b>Number of module</b>	<b>Name of the module</b>	<b>Responsible university lecturer</b>
<b>FOMS 2.1</b>	<b>Research planning</b>	<b>Prof. Dr. J. Pretzsch</b>
<b>Contents and objectives of qualification</b>	<p><u>Contents:</u> Elaboration of a research plan, typically in the area of management of natural resources including a literature survey, clearly formulated hypotheses or research questions as well as an outline of the methods to be applied. Understanding of relevant risks and ethical aspects. Literature survey with critical assessment of the perused material and corresponding to the standards of scientific papers. Determination of the scientific contents of scientific literature and of the elaborated research plans.</p> <p><u>Goals of qualification:</u> The students are able to recognize the quality of research plans and they can critically think within an academic discipline and they are able to sound argumentation. They can apply principles for the appropriate development of research projects including critical discussion of literature, problem identification, formulation of hypotheses and research questions, data requirements and selection of methods. They reveal independent ability for learning as a basis for life-long learning and are in a position to creatively solve problems by systematic research. In this they show the necessary competencies for scientific professional life and the key qualifications as well the ability to work independently and to work in the team.</p>	
<b>Forms of teaching and learning</b>	<p>The module comprises:</p> <ul style="list-style-type: none"> <li>4.0 hrs/wk seminar</li> <li>4.0 hrs/wk e-learning exercises</li> <li>Independent studies</li> </ul>	
<b>Preconditions for participation</b>	Knowledge of tropical forestry and development policy (Bachelor level)	
<b>Applicability</b>	The module is compulsory within the study unit <i>Sustainable Tropical Forestry</i> of the Master course <i>Tropical Forestry</i> .	
<b>Preconditions for allocation of credits</b>	The credits are obtained, when the module examination has been passed. The module examination consists of a protocol (20 hours), report (20 hours) and the research plan (125 hours).	
<b>Credits and grades</b>	10 credits can be obtained in the module. The module grade results from the average of the grades of the examination performances weighted as follows: Protocol about online exercises (20%), report (20%), research plan (60%).	
<b>Frequency of the module</b>	The module is offered each winter semester.	
<b>Effort</b>	The effort comprises 300 working hours.	
<b>Length of the module</b>	The module covers one semester.	